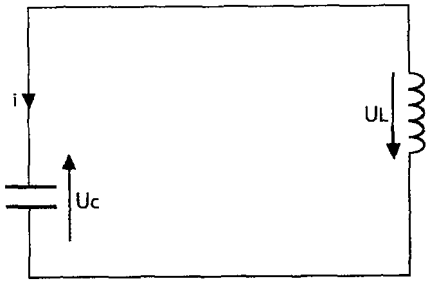
$R_2 > R_3 > R_1 > R_4$

(Plus la résistance augmente plus le nombre d'oscillations diminue)

III-

1) a-

La loi des mailles :



$u_C + u_L = 0$

$u_C + L\frac{di}{dt} = 0$

$u_C + LC\frac{d^2u_C}{dt^2} = 0$

$\Rightarrow \boxed{u_C + LC\frac{d^2u_C}{dt^2} = 0} \Rightarrow \boxed{q + LC\frac{d^2q}{dt^2} = 0}$

b- $u_C(t) = U_{C_{max}} \sin(\omega_0 t + \varphi)$

$\omega_0 = \frac{2\pi}{T_0}$ d'après le graphe.

$1{,}5T_0 = 20.10^{-3}$s

$1{,}5T_0 = 20.10^{-3}$

$T_0 = \frac{30.10^{-3}}{2{,}25} = 13{,}33.10^{-3}$s

$\omega_0 = \frac{2\pi}{13{,}33.10^{-3}} = 150\pi$ rad.s^{-1}

$u_{C_{max}} = 10$V.

A t=0 $u_C = u_{C_{max}} \sin\varphi = u_{C_{max}}$

$\sin\varphi = 1 \Rightarrow \varphi = \frac{\pi}{2}$ rad.

d'où $\boxed{U_C(t) = 10\sin(150\pi t + \frac{\pi}{2})}$

c- c_1. $q(t) = C.u_C(t)$

$q(t) = 10^{-4}\sin(150\pi t + \frac{\pi}{2})$

c_2. $i(t) = \frac{dq}{dt} = \boxed{4{,}7.10^{-2}\cos(150\pi t + \frac{\pi}{2}) = i(t)}$